

## ABSTRACT

The invention provides methods and compositions related to polynucleotides that induce methylation at a target nucleotide sequence within a cell. The polynucleotides include an oligonucleotide imprinting element that has a first strand and a second strand complementary to the first strand. The first strand can include at least one m5CG sequence which is paired with an unmethylated CG sequence on the second strand. Alternatively, the first strand can include at least one m5CN1G sequence paired with an unmethylated CN2G sequence on said second strand, wherein N1 is any nucleotide, and N2 is a nucleotide that pairs with N1. The polynucleotides also include a single-stranded oligonucleotide guiding element that is complementary to a target nucleotide sequence. The guiding element includes at least one m5CG sequence m5CG or at least one 5CN3G sequence, wherein N3 is any nucleotide. The imprinting element and guiding element are operably linked such that the polynucleotide is capable of inducing methylation at the target nucleotide sequence.